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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/429,530      | 10/28/1999  | YOSHIHIKO FUKUMOTO   | 35.C12395CIP        | 6048             |

5514 7590 07/31/2002

FITZPATRICK CELLA HARPER & SCINTO  
30 ROCKEFELLER PLAZA  
NEW YORK, NY 10112

EXAMINER

PEREZ RAMOS, VANESSA

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1765

21

DATE MAILED: 07/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

SN

|                              |                     |                     |  |
|------------------------------|---------------------|---------------------|--|
| <b>Office Action Summary</b> | Application No.     | Applicant(s)        |  |
|                              | 09/429,530          | FUKUMOTO, YOSHIHIKO |  |
|                              | Examiner            | Art Unit            |  |
|                              | Vanessa Perez-Ramos | 1765                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 May 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 11-20,25-27,30-32 and 45-54 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-20,25-27,30-32 and 45-54 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 11, 45-47 and 52 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitations that: (1) a second insulating film of a different material from the first insulating film and serving as a polishing stopper is formed; (2) forming an opening in the second insulating film wherein part of said film remains within the opening; (3) a metal film with a polishing rate greater than that of the insulating film; (4) etching to expose a portion of the second insulating film and forming a flat plane comprising the exposed portion and a polished metal surface; (5) a step of forming a third insulating layer serving as etch stopper after the second step and before the third step; (6) causing the insulating film to be a gate insulating film, forming a transistor, connecting to a drain region and forming an active matrix, causing the film to serve as a reflection electrode; and, (7) insulating film having a "columnar shape", comprise new matter not previously described in the Specification .

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3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 50-52 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

These claims contain the following indefinite language: "The process according to any one of claims 45-47".

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 11-20, 25-27, 30-32 and 45-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cote et al. (U.S. 5,262,354) in view of Cady (U.S. 4,544,446).

In regard to claims 11-12, 15, 17-20, 25-26, 30-32, 45-46 and 48-52, Cote discloses the deposition of his dielectric layer 10 over a substrate (col. 4, lines 36-37), wherein layer 10 can comprise several layers, including SiO<sub>2</sub> and SiN (col. 4, lines 52-55), which reads on Applicant's "first", "second" and "third" insulating layers; forming an opening in said layer (col. 4, line 36); forming a metal film, which can comprise aluminum, copper and alloys such as Al-Cu-Si (col. 4, lines 58-62); and, polishing by CMP the metal film (col. 4, lines 66-68) using a slurry containing an abrasive (col. 5, lines 1-6).

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Unlike the claimed invention, Cote does not disclose a step of washing with an ultrasonic wave, followed by a physical washing.

Cady discloses a semiconductor manufacturing process wherein a metal surface is polished (col. 2, lines 2-3), and the polished surface is cleaned by one of a variety of methods, including brush scrubbing (col. 1, line 53) and ultrasonic washing (col. 1, line 53-55).

Furthermore, Cady discloses that the reduction of contamination is very important, as contaminants may decrease a wafer's performance and even completely destroy the device (col. 1, lines 48-50 and col. 2, lines 1-13).

It is the Examiner's position that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Cote by washing the surface after polishing by physical and/or ultrasonic means, as per Cady, because polishing residue affects the reliability of a wafer, and thus contamination reduction is extremely important during semiconductor manufacturing. Furthermore, even though Cady does not disclose a cleaning step that involves a combination of both jet scrubbing and ultrasonic scrubbing, it is the Examiner's position that this would have been obvious to one skilled in the art at the time of the invention, with the anticipation of achieving a clean surface. Since both cleaning methods claimed by Applicant have been utilized in the past for the same purpose (removing contaminants after polishing), it is just obvious that a combination of two or more of these well known methods would at least achieve the same cleaning degree of one method alone, and most possibly, would provide a cleaner surface than that obtained by one cleaning step/method alone.

In regard to claims 13-14 and 16, the variation of process parameters such as the frequency and rpm would have been obvious to one skilled in the art with the purpose of determining the best process conditions.

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In regard to claim 27, the use of barrier metal layers is well known in the art of semiconductor manufacturing, and its use would have been obvious to one skilled in the art.

In regard to claims 53 and 54, the use of either wet or dry etching would have been obvious to one of ordinary skill in the art at the time of the invention, since both are well known and common methods.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Perez-Ramos whose telephone number is 703-306-5510. The examiner can normally be reached on Mon-Thurs 7:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-5665.

Vanessa Perez-Ramos  
Examiner  
Art Unit 1765

VPR  
July 25, 2002

ROBERT KUNEMUND  
PRIMARY PATENT EXAMINER  
A.U. 117